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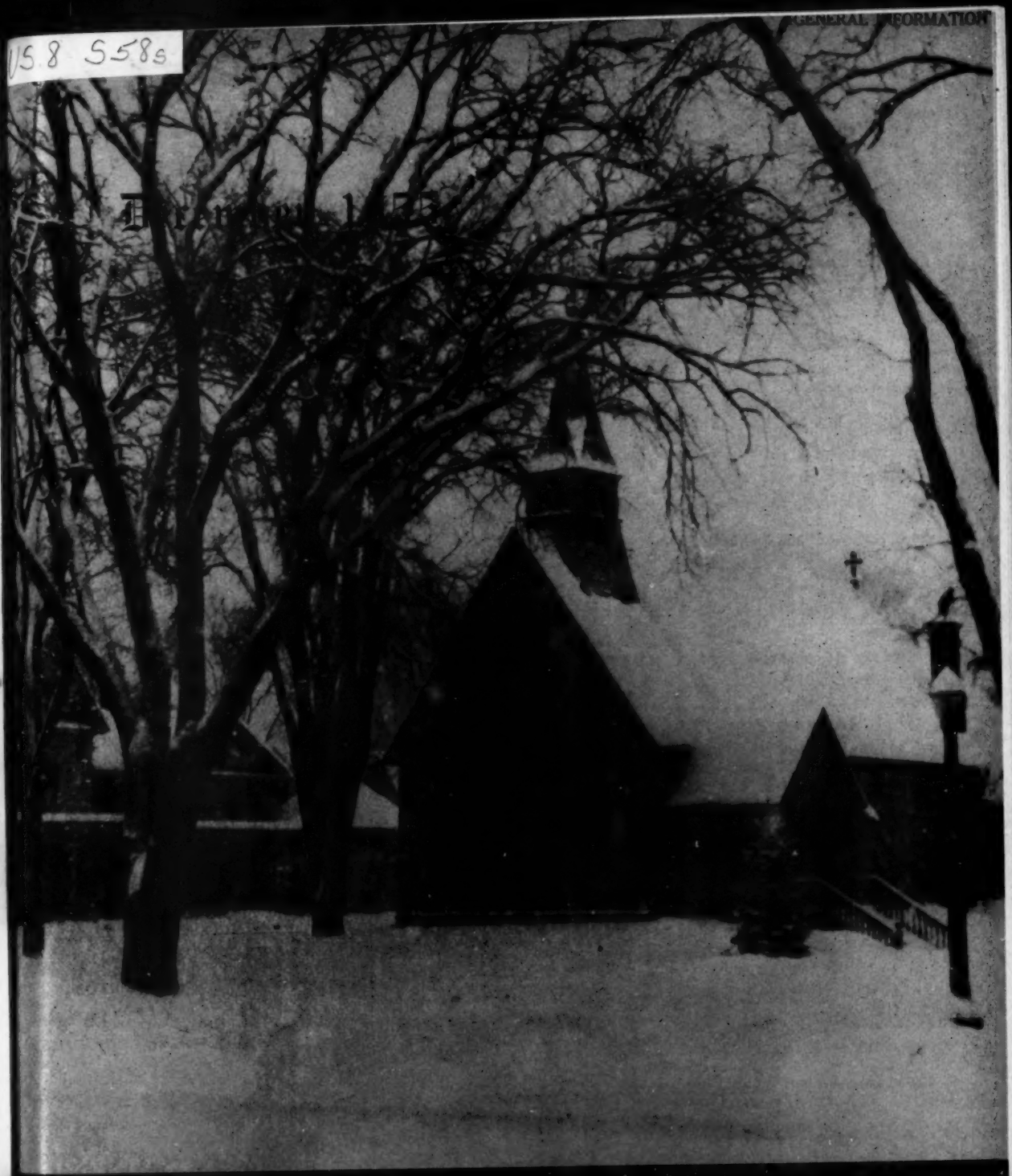

SOIL CONSERVATION

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SOIL CONSERVATION

DECEMBER 195

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★ THIS MONTH ★

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WELLINGTON BRINK
Editor

SOIL CONSERVATION is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. The printing of this publication has been approved by the Bureau of the Budget, July 18, 1955. SOIL CONSERVATION supplies information for workers of the Department of Agriculture and others engaged in soil conservation.

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TIME-TESTED VALUE. — Eighty-six 1-year subscriptions to SOIL CONSERVATION Magazine have been purchased for new cooperators by the Kingsbury County Soil Conservation District, De Smet, S. Dak. This brings the total number of subscriptions by this district to 741, which very likely tops all districts in the country.

Harold C. Fritzel, treasurer, writes: "Our board has made it a practice each year to send SOIL CONSERVATION Magazine to each new individual farmer when he signs up. Also, we include the banks, schools, and libraries in Kingsbury County. Seems to be a habit, and we are in no notion of breaking it."

SCHOOLS BENEFIT. — One-year subscriptions to this magazine have been supplied the 13 high schools of Atlantic and Cape May counties, in southern New Jersey, by courtesy of the supervisors of the Southeast Jersey Soil Conservation District.

Says Charles A. Dupras, secretary: "While agriculture is not the main industry in the district, it was felt that

(Continued on page 102)

Editors are invited to reprint material originating in this magazine.

FRONT COVER.—Winter comes to a New Hampshire village.

All orders go to the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Green Spot on the Idaho Map

Here is a ranch built by hard work and the pioneering instinct. Clay Sutton and family shifted from grain to livestock, brought in crested and intermediate wheatgrass, worked closely with their soil conservation district.

By HUGH F. EAMES

IN early June you drive through Midvale, Idaho, a Weiser River town, turn into Fairview School Road and after a few more miles come upon a series of well rounded hills. Spread over the tops and down the steep to gentle slopes, there is a thick and even covering of fresh green grass and alfalfa that looks to be at least knee deep. A lot of it may be 2 feet high. It is almost a solid mass wherever you look. Sturdy Hereford cattle, resting contentedly or grazing, break into the picture on some of the slopes and hilltops. In another field is a small herd of purebred Holsteins.

This pleasant scene continues for at least 2 miles. In the distant background are mountains against the blue sky. There are occasional patches of small woodsy growths and sometimes areas in trees. You round a turn and note a interrupting the sweep of rangeland are large modest little farmstead, attractively set amidst lawns and gardens with trees, shrubs, vines, and a riot of colorful blooms. A man and a woman are working there. If you drive into the yard, a smiling greeting awaits you. Eyes sparkle, handshakes are hearty. You are not a stranger very long.

Mr. and Mrs. W. Clay Sutton live here, and what grips one's admiration along the way is their farm, known as Eastside Ranch and embracing more than 3,000 acres. Closely tied up with it are 780 more acres that belong to their sons, Buhl and Wayne. Altogether the Suttons possess something like 3,900 debt-free acres, 2½ miles long and 1½ miles deep, handled as a single operation. Some 1,200 acres are being farmed, and less than 600 in the 3,000 total have been relegated, Clay says, to what he calls his "marginal" cropland. This acreage is being put into pasture grass seedings under a schedule that brings improvement every year.

They show it to you, take you right out into the hay fields and easy-to-reach pastures, close to the cattle, and tell you what it all means to them. It has put 5 children through 4 years of college. The sixth attended 2 years before he surrendered to an overwhelming urge to get back to the ranch. All of them went to the University of Idaho, like their dad, who worked his way through.

All of it makes a tremendous accomplishment since the Suttons started there on 280 acres in 1919. That was 10 years after Clay, his father and sister individually began homesteading in

Some of Sutton's choice beef animals, held in barn lot while river bottom pasture is being irrigated.

the Midvale area, and 53 years after Clay's parents and their 7 children, when Clay was 13, came from Missouri's Ozarks to homestead with only $8 in cash among them. The elder Sutton and his family cut and piled firewood for a Genesee, Idaho, hotelman in exchange for room and board. Then he got a $2-a-day laborer's job until he could rent a farm nearby. He didn't have enough money to buy land, even when it could be had for as little as $30 per acre—he just wouldn't go into debt.

"There's been quite a change since then for all of us," says Clay. Today, life is comparatively relaxed after the long years of toil and sacrifices.

It was difficult making a start in the Midvale area. All of the 280 acres which Clay Sutton undertook to buy after giving up homesteading was in cropland. But only 18 acres were in cultivation, the rest being in sagebrush which had to be cleared. For a long time there wasn't enough grass to carry 10 head of livestock. Years of hard work and an assist from the boom period enabled young Sutton to extend the use of his land and to buy additional acres, but he was saddled with debt. When the depression hit, he lost all of his land, with the exception of his original 280 acres and also all but 13 head of his livestock. He found it necessary to take an off-farm job to make a living.

As Clay remembers those years, "I really tried to lose all the property that I had because it was too much of a burden." He did not succeed in that. And the bank that took most of his land went broke. When the wreckage at last had been cleared away, Clay managed somehow to regain all of his former holdings and make a fresh start.

In those trying years and others that followed Clay learned something about land use and capabilities that he has never forgotten, because he put it to work on his farm and made it pay dividends. It was suggested to him one day when he tried to make a loan so he could pay his debts. The tip was in the answer that he got: "No loan to pay your debts, but a big enough loan if you want to use it to start a livestock operation."

Clay went back home and began to buy calves. They were cheap, and as his means permitted he made a beginning as a livestock farmer. Later he took a big step forward by buying two carloads of Herefords, 60 animals around which to build his purebred herd. Now he annually runs 300 head and buys and finishes-off 100 steers. When he sends his beef animals to market, all are sold as "choice"—top grade.

Farming continued to be difficult because of lack of balance in livestock, dairying, and small grain operations. Farming too much low-producing land cut into profits from the most productive acres. Average grain yield took a licking when his best land produced 25 to 30 bushels per acre as against 5 to 10 bushels from the poorer land. By eliminating the marginal acreage and seeding it to tame pasture grasses he achieved a better balance and got the additional pasture that he needed to carry his livestock.

An unexepcted break came during this crisis, when Civilian Conservation Corps (CCC) technicians came around with ideas for making better use of his land than growing grain and sinking into debt. They offered to help him seed 35 acres to a new type of grass fitted to his dry lands, to build fences to give control over grazing, to plant trees and shrubs that would provide shade for cattle, and to protect eroding streambanks and develop well located stock-watering places. All he was asked to do was to provide needed materials.

Sutton stretched his resources and met the requirements. Soil Conservation Service technicians working with the CCC taught him how to do the seeding. Camp labor built fences, planted trees and shrubs, built watering troughs, and developed springs. Clay used the recommended crested wheatgrass for the first planting to be made in that area. It fitted into the capabilities of his soil when seeded with alfalfa, big blue bunch, and bromegrass, and turned out the forage that Clay's livestock lacked.

Subsequently, intermediate wheatgrass also became a strong producer on the Sutton holdings. Its plantings doubled and redoubled as the years moved along. After 15 years of annual use, the original 35-acre planting of crested wheatgrass is still a good producing unit. It is not so thick as formerly, but Clay still points to it with pride. His total planting of crested and intermediate wheatgrass now runs to 370 acres and carries his cattle on these acres up to 8 months every year. Seventy acres, seeded

Mr. and Mrs. Clay Sutton and their sons, Buhl and Wayne.

last spring, looked promising after late June and early July rains.

When CCC ceased operations because its job had been finished, along came another organization that has been of tremendous service to Clay and about 500 other cooperators—the Weiser River Soil Conservation District.[1] Clay was in the group of 7 or 8 farmers who helped get the district going. He became its first secretary-treasurer and served in that capacity until early in the 1950's. What's more, he applied a soil and water conservation program to every acre that he acquired in building his 3,000-acre plant.

Except for 2 large tracts in pasture and 2 under irrigation, all of Clay's land and that of his sons is consolidated in one operation. The irrigated exceptions are 45 acres in the nearby Weiser River bottom lands, and 100 acres in Long Valley, Valley County. From his Weiser River bottom land he gets "a barn full of hay" from one cutting; he has harvested as much as 3 tons per acre there before turning in livestock to graze until freezing weather. In Long Valley he runs 90 head of livestock. The soil there will produce alsike-cloverseed and small grains, but its most profitable present use is pasture. Animals feed there until snow falls.

When you walk over the home farm with Clay he guides you to a 40-acre field that had puzzled you when you observed it from the highway. It didn't appear to have such lush growth as the other fields. In fact, it had a wornout appearance. But when you step into it and take a close look, you find that it isn't wornout at all. There is plenty of alfalfa, intermediate wheatgrass, and bulbous blue for the small herd that it feeding. "The field looks bad, but it really isn't," Clay points out. It got the "bad" look, he explains, because spring conditions made it necessary to run 21 grown animals and calves and yearlings there from early April until early June, when new pastures could be used. He left about a dozen head there and in mid-June they were not suffering for lack of good forage. "It was a good test for intermediate wheatgrass; proved that it has what it takes when it is necessary to carry a heavier than usual growth, then make a strong recovery," Clay commented.

Last year Sutton had 500 acres in alfalfa hay. He's down to 400 this year, having put new seedings in the other 100. When he seeds for hay, he puts grass in the mixture, using crested, pubescent, or intermediate wheatgrass, and bulbous blue. Clay says that bulbous blue is a strong factor because it is tops for early grazing and tops again in the late fall. Grass in all hay mixtures, he says, helps keep the growth clean.

In using 3,900 acres, Clay and his sons keep 1,000 and 1,200 acres in crops. About 540 are in grass and the remaining 2,100 in range. Wheat and barley are grown on 350 to 400 acres as feed for livestock. On dry land, wheat averages about 25 bushels per acre as contrasted to the 7 that he usually got in the early years. He grows no corn or oats, puts up no silage. He buys concentrates and sells surplus hay; last year he shipped to Missouri 91 carloads of alfalfa—60 from his own farm and 31 from his neighbors.

On irrigated pastures the Suttons seed alta fescue, smooth brome, orchardgrass, and ladino clover. On dry land the mixture contains alfalfa, sweetclover, bulbous blue, crested intermediate, or pubescent (Topar) wheatgrass.

Clay harvests seed from his alfalfa after

[1] See the article, "Grass Carpets Way to New Wealth," in the October 1955 SOIL CONSERVATION Magazine.

Here's how Sutton hay is housed in the ranch stack-yard.

cutting the first growth for hay. From his dry land he usually harvests as much as 2 tons per acre in the first cutting. Occasionally it goes as high as 3 tons. Seed production averages 100 to 200 pounds per acre, between 250 and 300 acres annually being put to this use. In 1953 he harvested 50,000 pounds. Last year he garnered more than 30,000 pounds which he is still holding. When he plowed with horses he let the alfalfa for hay and seed stand 10 to 12 years. Now, with tractor available, he finds it more profitable to turn alfalfa under after 5 or 6 years, and with this soil buildup he takes off 2 or 3 good crops of wheat. His son Buhl specializes in pubescent wheatgrass, to which he devotes 40 acres each year to seed production and pasturage. Some of this land has been yielding seed for 5 years.

In addition to his 10 years on the district's governing body, Clay has served 2 years as chairman of the Idaho State Association of Soil Conservation Districts, 19 years as a director of the Farmers Cooperative Creamery at Payette, and 14 years as a fieldman and appraiser for the Federal Land Bank of Spokane. He was elected to the Idaho State Legislature in 1954 for a 2-year term.

Mrs. Sutton, daughter of a minister, is a full-time partner in the Sutton enterprise. She has more than 400 varieties of iris in the flower gardens. She is a collector of vinegar cruets of which she has more than 300.

What the Suttons have put together at Eastside Ranch and its offshoots represents 35 years of earnest effort, the investment of considerable money, and close cooperation with the soil conservation district. But all of the expenditures for land and its development, for new barns and other farm buildings, for a new homstead, for equipment, and all the rest that goes into modern farming have come back two or three times as income has built up. The keys to his success, says Clay Sutton, were the decision to shift from grain to livestock and grass, the assistance received from the CCC and the district, and the guidance of SCS technicians.

But Clay reminds us: "We're not the only people who have had such benefits, and we're not the only people who are producing good grass and have good livestock operations. Right in this area 25 to 30 other farmers are benefiting from production of crested and intermediate wheatgrass, and in other parts of the soil conservation district there are many more. We haven't any monoply on good grass. If you want to see more, visit such farmers as Dewey Alexander, Lewis Brothers, Forest and Donald Sifton, Donald Beigh, Darrow Keithly, Roy Clelland, Robert Wiley, Leo Courtright, Milton Branch, Adolph Geartner, Jr., Andy Anderson, and Bob Finke. All of these ranchers, and many more, have good grass seedings. The Weiser River Soil Conservation District contains a lot of farmers who are making the best use of their land and protecting and improving it for use of generations yet to come."

SCHOOLS BENEFIT

(Continued from papge 98)

soil and moisture conservation was the concern of everyone. This is one way in which the broad program of soil and moisture conservation could be brought to the attention of a large number of students."

What Do We Mean by Creeping Alfalfas?

No. 10

This is the tenth of a series of articles to appear from time to time in explanation of the various phases of research being conducted by the Department of Agriculture on problems of soil and water conservation.

By HUGO O. GRAUMANN

PLANT breeders working with pasture type alafalfas have noted and reported much plant-to-plant variability in the nature and extent of the spreading habit. Occasional plants in breeding nurseries have shown unusual capacity for spread and yield. Mere observation of well developed plants of this type might easily lead the layman to envision a variety that is comprised entirely of lush growing, prolific creeping plants that unfailingly give the miraculous in performance. To help avoid such misconceptions, it seems appropriate to review what is really meant by creeping alfalfas and to point out briefly some of their limitations.

Alfalfas being investigated for pasture purposes may be placed in three distinct categories with regard to crown development and spreading ability. These are (1) wide, low-crowned types in which the underground portions of the stems show no tendency to develop roots, (2) wide, low-crowned types which have the inherent ability to produce rooting underground stems, and (3) those with low crowns which spread by means of creeping roots.

All alfalfas produce new buds at or near the crown. These buds give rise to the shoots which constitute the top growth. A prerequisite of superior alfalfas for pasturage is that they have low crowns with bud development largely underground so that trampling and grazing injury by livestock will be minimized. Such types currently available to the breeder produce most of their crown buds in the upper 3 or 4 inches of the soil. Crown width of these as determined by diameter of the plant at ground level may vary from 8 to 20 inches for those whose underground stems normally are nonrooting. The proper designation for such types is simply wide, low-crowned nonspreading alfalfas. Alfalfas which most nearly fit into this category are varieties such as Ladak and experimental strains such as A–224.

The wide, low-crowned types which develop roots, such as the varieties Nomad and Rhizoma, have been referred to as rhizomatous alfalfas. However, not all the plants in random populations from these varieties and similar experimental strains possess the spreading habit. Old established plantings of the rhizomatous varieties growing under the most ideal conditions for spreading will show both nonspreading and spreading plants. The spreading plants usually show little or no evidence of this characteristic

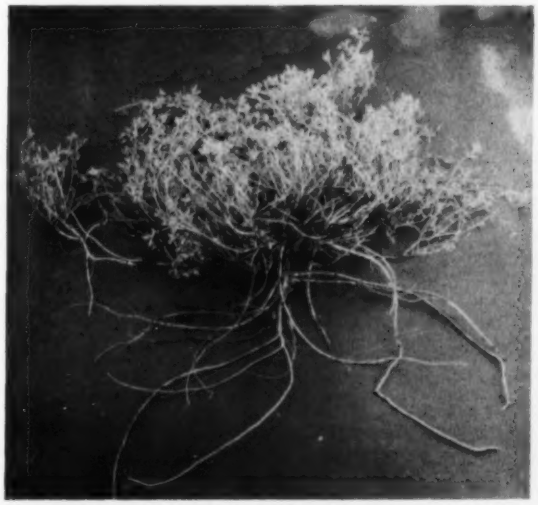


Figure 1.—A 2-year-old alfalfa plant from a rhizomatous experimental strain showing early stages of root development on one of the rooting underground stems.

Note.—The author is research agronomist, field crops research branch, Agricultural Research Service, U. S. Department of Agriculture, Beltsville, Md.

during the first 2 or 3 years following planting. The crown width of these when finally fully-developed may range from approximately 1½ feet upward (Figure 1). When grown in thin stands under hoof for years in relatively dry regions occasional plants have been observed to attain a spread of over 10 feet.

Creeping rootedness is recognized as an important means of vegetative spreading in alfalfa. Stocks possessing this characteristic have the inherent ability of sending out lateral rootstalks from the main root. These horizontal rootstocks are usually found 4 to 8 inches below the soil surface. They develop buds at irregular intervals which later emerge and develop as normal shoots or stems. Each of these green shoots is capable of developing eventually into an independent crown and plant (Figure 2). Not all plants in a random sexual population tracing to creeping-rooted parents will express creeping rootedness. Those that do will vary in extent and density of creep and they may not show new plants until the second year, or later, following planting. Individual plants of strongly creeping-rooted stocks growing under ideal conditions in spaced plantings have been observed to give rise to several hundred spearate crowns and to attain an overall spread of 5 to 9 feet within a period of 3 years.

The creeping-rooted alfalfas were described more than 40 years ago, but because of relatively low yields little use was made of them in breeding programs until recently. The most promising breeding stocks of these are the progenitors of Rambler, a creaping-rooted variety developed by the Dominion Department of Agriculture in Canada. Rambler and related stocks are being tested and utilized in breeding programs in the United States. It is hoped that adapted creeping-rooted varieties may become a reality to farmers of this country within the next 5 to 10 years.

Limited observations in test plantings scattered throughout the country indicate that the rhizomatous alfalfas may not express their spreading habit over as wide a range of soil and climatic conditions as do the creeping-rooted types. Additional research is necessary to determine whether differences in expressibility of these characters do exist and what environmental factors have the greatest restrictive or conducive influence on them.

Figure 2.—A partially excavated 2-year old plant showing spreading in an experimental strain of creeping-rooted alfalfa.

The pasture-type alfalfas, like the hay types, do best on deep, fertile, well drained soils. However, there is evidence to indicate that when subjected to grazing, and diseases are not a problem, the rhizomatous and creeping-rooted types might have more drought resistance and greater stand persistence than the conventional hay-type alfalfas. None of the pasture types excel in disease resistance.

Joint Action Pays Off

By BUD F. A. SVALBERG

"WELL, we got the job done—and a good one it is too," Jim Fackrell said, as he grinned from ear to ear. He was referring to the new headgate and diversion structure in the Blacks Fork River at the head of the Blacks Fork Canal in Uinta County, Wyo.

For over a year and a half, Jim, as chairman of the Blacks Fork Canal Company, had his troubles.

They began in the spring of 1953. Fast snowmelt in the high Uinta Mountains caused the Blacks Fork River to go on a rampage. The old headgate at the head of the canal could not take the strain. The raging water soon washed around and beneath the south end of the struc-

Note.—The author is work unit conservationist, Soil Conservation Service, Casper, Wyo.

ture and poured the full flow into the canal. Part of the water broke out of the canal and started down through Bridger Valley, taking along fences, bridges, and everything else in its way. Other water continued down the canal, sweeping out the headgates. The greatest flood damage occurred on the Smiths Fork Drainage. Amazing as it seems, the full flow of the river was diverted by the canal over the divide separating these two drainages.

This unexpected flow, added to the normal high water at this time of year, put terror in the hearts of onlookers. The entire flood plain was covered by the reddish-brown raging waters, thick with debris and topsoil from several miles above. Violent torrents were cutting new watercourses, and damage was widespread downstream, to the point where Smiths Fork emptied into Blacks Fork—a channel big enough to take the onslaught.

Despite the heavy and costly damages caused by the flood, when it was all over the critical issue was the loss of the main headgate and diversion. People were accustomed to floods. This one was merely a larger one than usual. What made it different was the destruction of the headgate.

An explanation may be necessary to understand the people's reaction. High water in the spring for a period of about 6 weeks, usually from May 15 to July 1, is normal. Indeed it provides the water for irrigation. About July 1 each year the water ordinarily recedes to where irrigation is practically at a standstill. From this time on, the diversion and headgate are responsible for any additional water available. Through two-thirds of the growing season there usually is a water shortage over much of Bridger Valley.

The Blacks Fork headgate and canal divert water from the Blacks Fork River and carry it to 75 farms and ranches. They also supply the domestic water needs for the town of Lyman. On these 75 farm units, a total of 17,550 acres are irrigated by water passing through the headgate.

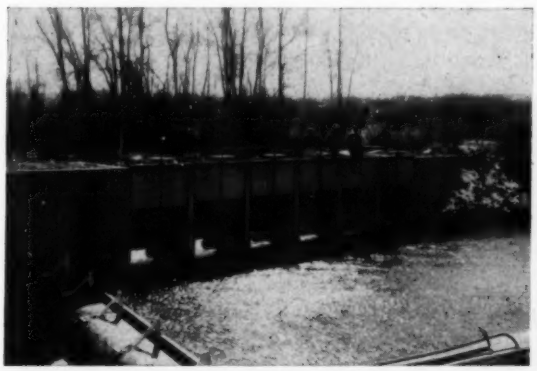
Jim Fackrell, and other board members of the Blacks Fork Canal Company—Ray Hooton, Gus Becker, and Ervin Larsen—really had a multiple problem to solve.

After a hurried appraisal of the situation, the board hired heavy equipment to make repairs and a temporary channel change. Thus, they diverted what little water remained in the river on down the canal. These efforts prevented a total crop loss for 1953 on the member units. Drought conditions prevailed throughout southwest Wyoming. Serious as they were, these drought conditions and the very light snowfall in the winter of 1953-54 were factors in forestalling still another serious flood in the spring of 1954.

Temporary measures for the immediate irrigation season helped but it was apparent that something more permanent would be required. From the 75 operating units in the canal company, upwards of 150 ideas and proposals had to be evaluated. In despair, the canal company board requested assistance from the Bridger Valley Soil Conservation District. The district approved the request, and in turn applied to the Soil Conservation Service for additional technical assistance to meet the crisis. A preliminary survey and report was made to the company. Out of it evolved a plan of operations, with everyone agreed that the job must be done right.

Surveys were completed the following fall and winter by the Soil Conservation Service, and design and specifications drawn up. At a special meeting of the company in March last year the question was reached: Where is the money coming from?

The threat of another flood was not too serious then, due to a subnormal snow pack in the mountains, and the members of the Canal Com-



All six gates on diversion dam are partly open, and stop logs in place, allowing desired amount of water to proceed down Lyman Canal.

pany voted to have their board of directors negotiate a loan with the Farmers Home Administration. By the last part of June there was the assurance of a loan of $18,000. A contract was eventually signed in the amount of $18,839.86.

Construction started in August 1954. The new structure was to be placed upstream about 500 feet, and the river channel changed to an old meander channel to compensate for this. During construction, the water in the river was diverted around the construction area and down the canal. The new headgate has six separate 42 inch x 72 inch gates, mounted in the framework of 113.6 cubic yards of reinforced concrete. The diversion is a gravity, cyclopean section of concrete across the river, whose elevation is the same as the bottom of the six separate gates. During periods of low water, stop logs can be laid against the retainers mounted in the diversion to increase the flow of water down the canal.

Harry N. Carlton, Soil Conservation Service engineer, who supervised the construction, certified its completion to the Canal Company in October, at a cost of $18,955.05.

While work was in progress, all members of the Canal Company signed a pooling agreement under the Agricultural Conservation Program. By doing this, the government shared in the cost of the structure to the amount of $4,105.71. Actually, it cost only 84½ cents per acre for each acre benefited—an amount small enough to please the most critical of the company, in view of the advantages offered.

In the past, $2,500 to $3,000 per year has been required for maintenance of the old structure and canal. This can now be reduced materially, and the savings used to pay off the FHA loan over the 20-year period.

Through the Bridger Valley Soil Conservation District, The Blacks Fork Canal Company has been able to utilize intelligently the services available, and accomplish their objective. The Soil Conservation Service, working through the Bridger Valley Soil Conservation District, made the necessary surveys, drew up plans and contracts, and supervised construction. The Farmers Home Administration financed the project. The Agriculture Conservation Program shared the cost in line with the principles of the 1954 program. Everyone can agree that Jim Fackrell has had his share of problems for the last 18 months. At this year's annual meeting of the Canal Company, Jim resigned as chairman. As his letter of resignation was being read to the meeting, his infectious grin carried the knowledge that his job had been well done.

Grass Replaces Wheat Without Loss of Income

By CHARLES C. LIMEBERRY

MANY ranchers in southeastern Washington are stopping erosion by transferring their steepest slopes from wheat to grass. This, in turn, builds soil fertility.

Stripcropping, contour farming, rough tillage, and other conservation practices have long enabled them to hold soil on sloping areas of cropland where otherwise they would have lost it. However, on their steepest slopes, these practices didn't always solve their erosion problems.

They knew, of course, that permanent cover would stop erosion. But to substitute grass or wheat would, they thought, mean loss of income, which would be particularly bad at a time when operating costs were soaring and farm revenues were sinking.

Now, since 5-year results have been racked up by Ward Hoskins, a grain and livestock producer, and by others who struck out boldly to

Note.—The author is a Soil Conservation Service technician assisting the Columbia Soil Conservation District at Dayton, Wash.

see just what would happen when they made the drastic shift, farmers in the Columbia Soil Conservatoin District are rapidly putting more and more of their steepest land into grass and are happy over the way it is paying off. Hoskins gave them the needed assurance when he found that "my permanent pasture, formerly good wheatland, is adding as much to my net farm income as it ever did when it was producing wheat." That is why he has increased the acreage of his steepest land from 8 acres in grass to 110 acres—all well protected because they are no longer in wheat.

The Ward Hoskins ranch, 6 miles north of Dayton, is of 320 acres—small as sizes run in Columbia County. Rainfall averages 17 inches

Once in wheat, this land is now in fine permanent pasture, well cross-fenced for rotation grazing.

annually, and it comes mostly in winter and spring. Soils are deep silt loams of very good productive capacity. Rolling hills have long slopes that range up to 40 percent. Wheat and green peas are the principal income crops. Ward has been operating here for 30 years, following his father, and all but 10 of his 320 acres were in wheat and peas before he started his grassland enterprise.

After watching the dark, rich topsoil give way to yellow subsoil, and shallow drainages become deep gullies as a result of erosion's sweep, Hoskins became alarmed and decided he had better do something about his soil losses. The first step was taken in 1949 when he developed a new operating program with the help of the Columbia Soil Conservation District, and seeded 8 acres to intermediate wheatgrass on steep land that Soil Conservation Service technicians had recommended for retirement from wheat. Hoskins tells what happened:

Sheep grazing on alternate-row seeding of intermediate wheatgrass and alfalfa on Ward Hoskins ranch.

"For some time I had been thinking about seeding pasture to carry my flock of 50 sheep. But wheat prices were good and I didn't see how I could afford to make this change. For a small test, I chose two 4-acre corner fields that were hard to farm so I wouldn't have much to lose. I really was surprised when I took 600 pounds of clean seed from one 4-acre piece and 10 tons of hay from the other. Productively, they were worth as much to me as if I had put the acreages in wheat and there were no soil losses where, in previous years, there had been severe washing."

His decision to expand his grassland came in 1951, when many farmers were plowing grassland and putting it into wheat because acreage restriction had been lifted. Ward met that situation by seeding 100 acres of his steepest cropland to intermediate wheat grass and alfalfa. Most of this acreage was in one block where he could establish good management practices and not interfere with cropland cultivation.

He already had decided that sheep were his best bet in a livestock program. When he doubled his flock size by purchasing 50 purebred ewes, there was a "great shaking of heads" because cattle prices were high, but it proved to be a wise choice.

Today Hoskins has 200 acres in cultivation; half in wheat and half in Austrian winter peas which are plowed under annually for green manure. He has 110 acres in permanent pasture and keeps a breeding flock of 325 sheep on the ranch year-round. Permanent pasture is fenced into 8 units, which supply 6 months of deferred rotational grazing. Peas and wheat

(Continued on page 112)

Story of a Small Ripple That Spread

Ripples on a pond in the West Box Elder Soil

By REESE HARBU

HAVE you ever noticed the ripple that your fishing line or a pebble makes on the surface of a still pool? The next time you get a chance pay particular attention to this characteristic of water. Even the smallest water flea—one that you can scarcely see—makes a ripple when it lands on the surface of a pool. The ripple starts at the center and spreads all around.

So it is in an area such as the West Box Elder Soil Conservation District in which water for irrigation is a major problem. Even the smallest improvement makes a ripple that is felt not only by the individual owner but by his community, his state, and his country.

Let me tell you how this characteristic of water was brought to my attention. During the summer of 1948 a partnership, composed of my father, brother, and myself, drilled 4 shallow pump wells—the beginning of a water development program that was to grow to include 8 wells that produce enough water for 300 acres of good bottom land that formerly produced little more than a rank growth of sagebrush. The drilling was done with the idea of producing a series of shallow wells for cheap pumping so that the stream from 2 or more wells could be combined to give a good irrigating stream.

If you were to compare this water development on one ranch to some of the larger projects that we hear so much about, you might imagine that it is of no importance. But, we also might compare it to the flea, no matter how small. You can still watch the ripples spread.

Let us start at the center of our ripple. What has this new water development meant to me? It has given me means to make a good livelihood without leaving my home community, as so many of my friends have had to do, because while we have lots of good soil, water for irrigation is a limiting factor. It has given me the opportunity to enjoy a rare and very precious association with my family—my parents, brother, and sister.

What has it meant to our family and our family business? No longer are we faced with the yearly squeeze either way, being caught short of feed for our cattle during a long hard winter, or being caught short of water to raise a new crop the summer following a light winter. No longer are we forced to leave a poor stand of alfalfa, long after it should be plowed under, simply because, due to the water shortage during late summer, it is a major accomplishment to plant and save a good stand for hay. Even after a drought year such as 1954, when our district was declared within a disaster area, we were able to produce a short crop of hay. It enabled us to feed through the winter without having the additional financial

Note.—The author is a supervisor of the West Box Elder Soil Conservation District, Grouse Creek, Utah.

Spread...and Spread...and Spread

he West [illegible]der Soil Conservation District.

EESE [illegible]ARBURTON

burden of buying more hay or being forced to sell our basic cow herd with the resulting blow to our business. Water development gave us a good base to which we added rangeland to give us year-round ranching operation, a cattle business that is a means of a good living for us all. We have remodeled and built up the ranch living quarters. The home now has water under pressure, electricity, and nearly all of the appliances that make for better living.

Now let us see how those ripples spread from the center. The development of the water was immediately felt by the pump and machinery dealers, for it takes pumping equipment as well as tractors, drills, levelers, and all the harvesting equipment that is required to farm the modern way. It was felt by the neighborhood banker, grocery store, school, and church. The county assessor and state tax commission also notice the ripple via increased valuation of those acres as well as on the equipment needed to farm them.

The carpenter, plumber, electrician, and lumber, hardware, and appliance dealer felt the ripple when the ranch buildings were built and improved. The fuel and oil dealers noted the ripple by increased sales of those products. The sportsman also feels the ripple, for where there was only 1 duck, 1 pheasant, or 1 prairie chicken, now there are 10, and feed for many more.

We used diesel pumping plants on our wells the first 3 years, after which a three-phase power line was constructed to bring electricity with all of its modern conveniences and services that help to make modern living. It seemed that those spreading ripples had influenced the directors of the electric co-op to furnish power for wells in developing of underground water of our area.

So it was that a committee of community leaders realized a dream come true. This committee, along with our neighboring communities, had been working for 5 years trying to interest different power companies in bringing power into our area. It resulted in all the conveniences of living in this modern age for several communities and outlying ranch homes.

The electrician, repairman, appliance salesman, as well as a host of other people who have goods and services to sell, all felt the ripples as they spread again. More dramatic than usual, perhaps, but still an example of how the ripples spread and are felt by the neighboring communities.

We are working toward the solution of the water problems on our ranch that will start more ripples. An irrigation company, in which we have an interest, is well through the technicalities that go into preparations for building a dam that will provide winter storage for water which can be more beneficially used during a growing season. At present the stream, with which this company is working, is fed by springs which produce an even flow of 3

second-feet year-round. This flow is controlled by an old reservoir which can be filled in 10 days before the flow starts to move through it. During nongrowing months this overflow is spread over pastureland and meadows in an attempt to get some value out of it. However, we realize that we cannot get effective use of all available water until we have good storage facilities.

We have a good site for storage of winter flow and some early spring runoff, at a cost that will produce a sound investment. If built according to present plans, it would bring irrigation to an additional 800 acres. Watch the ripples spread—a lot of new ripples to touch the rancher and his family, hired help, community stores, school, church, and everyone who has goods or services to sell. The ripples never stop for the effect of them starts an endless chain of new ripples.

This storage reservoir was a dream of ranchers in my father's generation. They investigated the possibilities. They were faced with the problem of food and clothing and education for their families, equipment and seed for cropping, cultivating and harvesting, and other expenses in ranch operations. All of these things had to come out of the return from farm crop production that could be sold in our free enterprise system. Usually it requires a lot of careful planning before the average rancher and farmer can see their way to invest such a large sum as would be necessary. Small wonder, then, that these ranchers, when they learned the cost of the dam, turned without a word and walked away with shattered dreams falling around slumped shoulders.

All of the older ranchers, except my father, have sold out. Young men of my generation have bought the ranches and inherited the dream of a storage reservoir—and its problems. Will they leave the building of that dam for the next generation? No. Through their West Box Elder Soil Conservation District they receive very valuable services and reinforcements. Among these are the Soil Conservation Service technicians who have come in to investigate the problems. In response to requests that ranchers have made to their soil conservation district, these technicians—engineers, geologists, agronomists, soil scientists, and others, including irrigation specialists—are digging deep into all soil and water conservation possibilities as they become acquainted with the ranchers, their land, and overall needs.

Part of the streamflow is necessary for culinary and stock watering purposes, a loss of storable water for irrigation. To avoid this loss the technicians and ranchers together are considering the drilling of wells for culinary and stock watering purposes and let all streamflow go into storage. The ranchers of the company are now striving for a common goal. After 2 years of cooperative work, our ranchers have developed confidence in these men. They also have found that their soil conservation district will stay with them, because *they* are the district—will help plan the dam, establish the irrigation system, and instruct them in the proper application of the streamflow. And they know that their district will stand by and help them with maintenance and operating problems. This time they are certain, the long held dream is going to become a reality.

These services are also available for protecting the small watershed and establishing control of runoff that eventually, if unchecked, would fill the reservoir with eroded soil. Springs and waterholes may have to be improved and maintained to better distribute livestock and wild game, which would result in the improvement and maintenance of grass and other cover that keeps the soil up on the watershed. This program means that rain and snow runoff will be controlled, starting where it begins. Instead of a tremendous water and silt flooding that does a lot of damage to everything in its path, we will have a smaller flush spread over a longer period, and an increase in the flow of springs that feed the stream from which irrigation water comes. Spreading ripples from this general project will save money for every taxpayer — homeowners who have suffered heavy annual losses in damage to land, buildings, and roads. It means more and better grass cover for wildlife. Streams will have more and clearer water; more fish to take the angler's lures. The Fish and Wildlife Service is actively cooperating with ranchers in planting young fish in streams and helping to control rabbit damage. This is one example of how organizations and ranchers work together through the West Box Elder Soil Conservation District.

Ross Warburton and his son, Reese Warburton.

Let us consider present development of our company storage project with development of the wells on our ranch. We began that underground water development 3 years before the West Box Elder Soil Conservation District was organized by the votes of the ranchers. During those 3 years we spent a lot of time in study, and considerable money. This effort involved a special study of underground water and geology while I was a student at the University of Utah. It required considerable travel and investigation; many things that the average rancher doesn't have opportunity, time, and means to do. We made good use of bulletins and other printed reference material supplied by the Extension Service. These helps, though very valuable, were not enough. We needed guidance in tying theories down to our own individual problems in all of their varying phases. It wasn't available at a price we could afford to pay.

Now contrast that situation with the services and assistance that we have through our West Box Elder Soil Conservation District and its cooperating technicians. The answers to those problems are right at our doorsteps. The technicians come to our ranches and work with us; give us the benefit of their skill and experience which is backed up by the laboratories, tests, and experimental plots of government agencies and the practical knowledge gained from work with thousands of farmers and ranchers. That is why I have a deep appreciation for my soil conservation district and why I support it so enthusiastically.

The district was organized to place the primary responsibility for local soil and water conservation on the landowners. It is legally charged, as an arm of State Government, with planning the programs, obtaining the information, procuring the services, and doing the things that citizens working alone would not be able to do.

Our district is recognized as a clearing house for improved agricultural practices that enter into soil and water conservation, watershed protection, and flood prevention. It is a practical medium through which influences and assistance of local businessmen, nonagricultural landowners, professional groups, local, county, State, and Federal agencies, and many other groups or individuals, are brought to bear in an effective and constructive manner. It is the best organization yet devised to get the overall soil and water conservation done.

In the West Box Elder Soil Conservation District's operating program, which was set up when the district was first organized, water conservation projects such as pipe lines, irrigation structures, canals, diversion and storage dams have first priority, with grass and range management next in line. In 2 years, despite setbacks received from low cattle prices, droughts, and so on, our ranchers, with the help of their district and the Soil Conservation Service technicians have made a very good start in solving their water and grass problems. For example, they have excavated 143 miles of ditches, built 21 ponds, 43 stock water facilities, and 52 headgates. They have improved water application on 1,200 acres and obtained engineering surveys on 24 proposed storage dam sites.

One large water conservation project has been completed by the Fisher Creek Irrigation Company at Park Valley, Utah. It includes 3.4 miles of 15-inch concrete pipe with all of the necessary diversion and distribution structures. There is no loss of valuable water now, as contrasted to the loss that occurred before this improvement was made. Records of a test made before the project was started indicated a loss of 80 percent of the water at a point 2 miles

below where the pipeline now starts, and a loss of 99.3 percent at the point where the pipeline now ends. Almost unbelievable, isn't it? This is one example of some of the potential water conservation possibilities of our district.

In spite of the drought, ranchers by use of water from this pipeline were able to harvest at least half of an average crop of hay in 1954. They also had livestock water in their pastures and drinking water, where likely there would have been none. Watch the ripples spread. They never seem to stop.

This pipeline project was financed mainly through the Utah Water and Power Board and its revolving fund. The Agricultural Conservation Program Service also gave substantial help through its cost-sharing program. The Utah Water and Power Board loans money on a longtime basis, with no interest, to groups of people for use in water conservation developments. Citizens who support this fund think of it as an investment in the future of our state. The board recognizes that water conservation practices, such as the Fisher Creek pipeline, involve a heavy initial cost that the individual landowner sometimes is unable to meet, and the project, though it is vitally needed, is left for the next generation. Thus, we see county, State, and Federal agencies working together. It is a policy that puts a lot of new ripples into action.

Almost everyone has read about towns and cities raising funds to attract new industries. Often they have totally ignored the welfare of an industry that they already have, an industry that contributes importantly to the welfare of the area—agriculture. Often they are unaware of the characteristic of water—how ripples spread from conservation of water, whether it is for irrigation or stock use, or for watershed protection and flood prevention.

As I understand the situation, a soil conservation practice is considered to be a poor one unless the farmer or rancher gets a return of $2 for every dollar that he spends in establishing and maintaining it. Moreover, it has been estimated that farm dollars are created wealth and that they turn over seven times before they complete their cycle. This means that every dollar produced on farmland puts $7 into circulation. I believe that expanded farm income will increase money in circulation many times more than most towns and cities will ever be able to get through industrialization.

One of my father's favorite sayings is: "There are two kinds of people in this world of ours—first, dreamers, and second, dreamers and doers, and I like to think that I am a dreamer and a doer." Don't we all?

Yes, we all have our dreams. They may be a farmer's dreams of ample irrigation water; the businessman's dreams of more orders and more production; the industrial worker's dreams of a fatter pay envelope; a banker's dreams of more deposits, more money to invest, more dividends; a housewife's dream of new labor-saving facilities that will take some of the drudgery out of her work; a sportsman's dreams of better hunting and fishing—dreams of better opportunity, even a land of plenty for our children. No matter what our dream may be those spreading ripples touch them all. But it takes a lot of doing to start those ripples.

We should all support conservation of water and soil and learn for ourselves what a soil conservation district is and what it is trying to do. The importance of soil and water conservation and development has been established. The farmers and ranchers of our soil conservation districts with the assistance of cooperating technicians and others who have helped are doing a good job in starting those ripples to spreading. We are all vitally concerned in keeping those ripples spreading in a way that will benefit everyone—our communities, our state, and our country, now and in the future, to make us all stronger economically and spiritually.

GRASS REPLACES WHEAT

(Continued from page 107)

stubble yield 2 months grazing. During 4 winter months sheep feed on pea hay bought from neighbors at $25 a ton.

During the past 3 years, wheat production has averaged 40 bushels per acre. A lambing percentage of 125 has allowed annual marketing of 300 fat lambs and furnished replacement animals. Each of the 325 mature animals has produced 12 pounds of wool annually. Hoskins' gross income from sheep has averaged about $7,800 yearly.

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Writing Team Befriends the Land

By LESTER FOX

The Houghs and their silver cup.

MR. AND MRS. HENRY BEETLE HOUGH, editors and publishers of the *Vineyard Gazette*, are poets at heart. And poets are naturally conservationists. They don't like to see any of Nature's handiwork destroyed or damaged.

It's no great wonder, then, that Mr. and Mrs. Hough have won permanent ownership of a silver cup offered by the Dukes (Martha's Vineyard, Mass.) Soil Conservation District to the one doing the most to help in the wise and productive use of soil and water resources.

The cup had to be won three times for permanent ownership. One-time winners have been E. B. Keith, W. W. Piney, A. M. Fischer, and James Cagney, the actor. They all had 1-year possession of the trophy for conservation work they did on their farms.

Ever since they bought the *Gazette* in 1920 when it was 74 years old, the Houghs enlisted the interest of islanders in the good use of their natural resources.

"We've always been interested in conserving our forests and wildlife," Hough said. "Then when the Soil Conservation Service came into being, we learned of the need of conserving our soil and water resources. The coming of the SCS gave us the first definite opportunity to work for the conservation of our natural resources on a comprehensive front.

"It has been a great satisfaction to be able to tie in with the effective leadership the Soil Conservation Service has provided. The SCS has given us a comprehensive program of action that we can put our teeth into. It advanced the whole field of conservation from the theoretical to the practical, from the abstract to the concrete.

"Soil Conservation Service men are out in the field where they can see what's happening and what ought to be done and can be done. They make the whole business of conservation real and immediate."

The Houghs have no farm on which to practice what they preach but they do own a 10-acre piece of land around their home in Edgartown, where they publish their newspaper. They are developing this into a wildlife refuge with the help of Ezra Shaw, the SCS technician for Martha's Vineyard and Nantucket.

In developing the *Gazette* into a famous newspaper, the Houghs have successfully defied a number of journalistic bugaboos. They have shied away from the nervous, rapid fire type of writing thought necessary in these days of fast living when everyone is supposed to read and run. Instead the writing is leisurely and the general tone poetic. In fact they publish poetry as it comes in, a practice that would give most city editors the horrors. And most of it's good stuff.

The old-fashioned idea of putting advertisements on the front page does not disturb the Houghs. They have a sensible reason for doing so: it enables them to provide a better balance of news and ads on the inside pages.

The Houghs have the odd idea that the public is interested in something besides murders, accidents, scandals, juvenile delinquency, and

Note.—An article on the Houghs' promotion of conservation farming on Martha's Vineyard appeared in the February 1953 issue of this magazine.

Collie Dundee Bold leads way on stroll at edge of pond.

other forms of abnormal behavior. This sort of news the *Gazette* prints if and when it happens but it's written with a sense of proportion. And with it *Gazette* readers get news and observations about birds and wild flowers, schools, literature, music, the tides, and the little animals of the island. Letters from readers are often literary gems. Islanders traveling abroad send back vivid and mature accounts of their observations. Current events, whenever appropriate, are linked with the colorful past of Martha's Vineyard and its adventurous captains of the sea.

A subscriber's masterpiece on the futility of the tomato as food brings a flood of responses as bright and humorous as the original.

Readers show their interest in this kind of newspaper by subscribing for it in large numbers. The Houghs have increased circulation almost tenfold. Many of the summer visitors, for whom the Houghs publish their newspaper twice a week in July and August, are regular subscribers. Half the circulation is off-island. The *Gazette* goes all over the world.

The Houghs, both graduates of the Pulitzer School of Journalism, Columbia University, provide a training ground for beginning journalists.

"My wife," Mr. Hough said, "has exceptional skill in developing writing talent in others and in disciplining their minds without ruining their enthusiasm and originality."

Peter Bunzel, for example, is a recent *Gazette* graduate. After his apprenticeship there, he went to *Life*.

William J. Jorden had his first newspaper experience as a summer reporter on the *Gazette*. He became Tokio correspondent of the *New York Times*. William Attwood became foreign editor of *Look* and Howard Young went to *This Week*.

Phyllis Meras, a Wellesly graduate, was slated to be a school teacher until she got a taste of newspaper work as a summer vacation reporter on the *Gazette*. She went from the island weekly to the woman's page of the *Providence Journal*.

Then there were the three nieces of the late great drama critic and author, Alexander Woollcott: Barbara, Joan, and Polly Woollcott. All started newspaper careers on the *Gazette*.

Barbara went to the *New York Herald Tribune* and wrote a book, "None But the Mule," before she married John J. Scannell. Curiously enough, Scannell became chief mechanic on the *Gazette* and brought Barbara back to the island to live. They named their home "God's Pocket."

Joan Woollcott graduated to the *Philadelphia Bulletin*. She married Fritz Jennings who teaches in Philadelphia.

Polly Woollcott married an artist, Stan Murphy, who decided that Martha's Vineyard had the right atmosphere for a painter. Like sister Barbara, Polly became a permanent resident of the island.

Henry Hough himself has developed his writing talent on Martha's Vineyard. He has written half a dozen or more novels, a couple of nonfiction books, and numerous magazine articles. His best selling "Country Editor," published in 1940, is still in demand. It revealed him and Mrs. Hough as the kind of thoughtful persons who would naturally give unstinted support to conservation.

Soil and Water for the Future

By D. A. WILLIAMS

OUR national soil and water problems stem from our people—the 166 million we can count today, plus the added millions that population experts say we must figure on annually for an unforseeable period. All the people are dependent on the soil and water resources of our land for their daily living.

This is a continuing proposition. It has been so ever since our country was settled. It will continue so into the unforseeable future. It is now estimated that by 1975 we will reach an upper limit of 225 million people.

The significance of this population growth is far reaching. Our growing country must be supported from our present agricultural lands because most of our new land frontiers were crossed some years ago.

While the immediate future confronts us with pressing problems of surplus production of many commodities, I am convinced that those of us concerned with resource protection and development have an obligation to take a long-term view of our resources in terms of population growth. Abundant agricultural production is so important to our continued existence as a free nation that we cannot run the risk of failing to look far enough ahead.

How well we do in meeting the future demands on agriculture will depend in large measure on how we manage the soil we now have and the water resources related to them.

The national conservation problem is to protect and improve the agricultural land we have for efficient production on a sustained basis. Across the Nation generally we are making good progress in applying soil and water conservation measures to the land. Accomplishments have been substantial and they are on the increase.

But the conservation job is far, far, far from being finished. We must further step up the rate at which soil and water conservation practices are being applied on the land throughout the country. The problems still with us are varied and complex and they are being vigorously attacked across the Nation through soil conservation districts. One problem difficult to get at has to do with the withdrawal of good agricultural land to nonagricultural uses.

Some of our best agricultural land has been and is being withdrawn to nonagricultural uses. More than 115 million acres are currently occupied by cities, highways, roads, and railroad rights-of-way, defense establishments, factories, mines, airports, parks, etc. About 80 million acres of this was originally good cultivatable land. Many people are becoming alarmed by the current rate of conversion of good land to nonagricultural uses. It is often the best agricultural lands that are being diverted to suburban developments, highway growth, and industrial expansion. They are usually the most desirable for such development because of topography, drainage, and other natural features. These factors contribute to cheaper construction and maintenance costs.

During the last 6 months we in the Soil Conservation Service have made a nationwide appraisal of nonagricultural land encroachments to develop a current and reliable measure of the scope of this problem. In most states estimates were made county-by-county and I believe that we can put confidence in these figures. Estimates were made for three 5-year periods: 1942-46, 1947-51, and 1952 through 1956. The rate of withdrawals has accelerated during the last period compared with the two previous periods.

I, personally, was amazed to find that our appraisal throughout the country indicates the trend of withdrawal of cultivatable land from agricultural uses is more than double what we thought it was. During the past 15 years our estimates show about 17 million acres of our flattest and most fertile farmlands have been converted to nonagricultural uses. Each year over 1 million acres of cultivatable land is going into homesites, industrial and commercial devel-

Note.—This article is based on an address by the Administrator of the Soil Conservation Service, at the annual meeting of the National Reclamation Association in Lincoln, Nebr., October 26, 1955.

opments, defense establishments, highways, airports, and other nonagricultural uses. During the same 15-year period an additional 3 million acres of cultivatable land is estimated to have been converted to commercial pulpwood production in the South. This acreage is primarily in Georgia and Florida but extends to other Southern States. The production of fiber products is. of course, necessary in our expanding economy. Many of these holdings are owned by paper companies who expect to stay in this business for a long time so, for all practical purposes, this land is not available for cultivation or pasture.

This changing land use pattern has gone on largely unnoticed except in areas where it has been accelerated during the last few years to such an extent that it is recognized as a matter of public concern. The withdrawals the past 15 years represent almost 3 percent of the total land suitable for cultivation in the United States. If the withdrawals continue at the present rate for another 15 years, a total of more than 100 million acres of land which was once suitable for cultivation will have been retired to nonagricultural uses.

One million acres of the best cropland in each of the States of Ohio, Indiana, and Texas have been withdrawn for nonagricultural uses in the last 15 years. Over three-quarters of a million acres have been lost in each of the States of California, South Carolina, Michigan, New York, and Oklahoma. Conversions of cultivatable land in the western Corn Belt and Great Plains are generally at a slower rate than in most other parts of the country.

Of the total cultivatable land withdrawals, about two-fifths went into such public uses as highways and airports, military and defense establishments, reservoir, recreational, and similar uses. The other three-fifths of the land diverted from agricultural use to nonagricultural uses went into private developments, cities, industrial, and other uses. About one-quarter of this private development was for commercial pulpwood and timber production. This major shift in land use during the past 15 years represents the equivalent of cropland on 225,000 average sized American farms. It is only reasonable to assume, because of the location of these farms to cities and industrial areas, that the actual number of farms is greater than this.

The problem in California has probably received more widespread attention than in other parts of the nation. Over 1 acre out of 7 of land suitable for cultivation in the State is now in nonagricultural use. The situation has been so acute in some spots in the State consideration is being given to regulation of areas which may be converted to nonagricultural use.

What will the future trends be in this respect? It is only reasonable to surmise that with the continued rapid growth of suburban developments, superhighways, industrial expansion, etc., that the withdrawal of good land from agricultural use will continue and accelerate, perhaps, in the years ahead. If continued at the present rate, this withdrawal could have a substantial bearing on the future ability of agriculture to meet demands of the Nation.

Some of the loss of good cropland, however, through nonagricultural encroachment is unnecessary. There is plenty of other land not suited to crops available for many of these uses. In some affected communities the question constantly arises as to whether zoning ordinances could be used effectively to protect the Nation's good cropland from being diverted to other uses. Attendant with the actual breaking up of farms is higher taxes and labor costs for remaining farms and other dislocations which affect agricultural production.

I am sure that I do not know the answer. But, it has become apparent that the problem of land withdrawal from agriculture has become an important part of the overall national conservation problem. We need to take a longtime look at this along with other land problems to see it in its proper perspective.

We can't stop the wheels of progress. We will continue to need living and working space for our increased population but we can plan for intelligent use of land devoted to these purposes so as to maintain our agricultural plant.

It seems self-evident that the national conservation problem is of considerable magnitude and of direct concern to all citizens in cities and towns, and on farms and ranches.

The final responsibility, of course, for carrying out a sound vigorous program of soil and water conservation rests with the people who own and operate the land. A national conservation program, however urgent its need, cannot have force in a democracy unless it is ac-

cepted as the individual responsibility of the man who uses and manages the resources.

We have learned from experience that the success of the soil conservation program depends upon local responsibility and leadership. The soil conservation district has proved to be an effective mechanism through which local responsibility and leadership in soil and water conservation can be assumed and local needs and desires can be made known. Because soil conservation districts are local units of State government, organized and controlled by local people they are a highly effective device through which government can serve farmers without dominating them. As you know, the technical services of the Soil Conservation Service are made available to farmers and ranchers through soil conservation districts.

Your Reclamation Association has recognized the role of districts from the outset and has cooperated with them. A large number of reclamation projects are using soil survey data as a basis for their development—data gathered by the Soil Conservation Service through soil conservation districts. Land capability inventories have helped determine what land in proposed projects would be suited for irrigation, and the best kind of irrigation, land treatment, and cropping that would be needed to insure safe and most productive use of land.

One of the real significant items of progress, in my opinion, has been the growing understanding of the importance of water in agriculture and the entire national economy. We are now beginning to recognize that water is life itself, both physical and economic, not only in the West but throughout the entire Nation. It is becoming apparant to more and more people that water will become a significant limiting factor to expanding agricultural production and the growth of our entire economy in the years ahead. Our future progress as a Nation will depend in a large measure on our success in managing our water resources.

We are now in the stage of competition, not only for the use of water, but for the right to use it. Interstate compacts are developed to divide up available water supplies among compacting states. Industry is carefully evaluating location in relation to available water supplies.

It is estimated that the total withdrawal of water for all uses in the United States has doubled twice in the last 50 years. We have every reason to expect that the total demand for water will double again within the next 25 years . . . if not sooner. Our needs for water are now such that we must seek the maximum utilization of all water from the time rain and snow falls upon the land until the water finds its way again to the sea.

It has become apparent that water management will become one of our most important conservation activities of the future. Water management must begin where the rain hits the earth and the snow begins to melt because all of our water for all uses is supplied from the clouds in the sky.

Water in streams and wells, and in storage reservoirs for towns and cities, and for irrigation is merely an accumulation of rain and snow that once fell on the land. Water management must start with the right land use for each kind of land and the application of needed conservation practices to prevent erosion and conserve water.

It has also become apparent that water development and management are inseparable from land management and use. The water element cannot be separated from the soil element in a successful conservation effort. Wherever useful plants are grown, water is needed to grow them. Wherever water is used, there is, without soil conservation, some degree of troublesome soil erosion. The soil and water problems on irrigated lands of the West reach in an unbroken chain from the watershed source of the water to the lower end of the farthest fields in the districts where the excess irrigation water finally drains away.

Sediment, the product of soil erosion, is a serious threat to the progress of irrigation farming. As reservoirs fill with sediment, as canal maintenance costs rise, a heavier burden falls on the water users. Irrigation farming without soil conservation measures to offset the threat of sedimentation, will weaken and gradually decline.

Sedimentation, however, is not our only problem in irrigated areas. The overall irrigation efficiency has been estimated to be less than 30 percent in most states. Nearly one-half of the water diverted from streams is lost in conveyance and half of that delivered to the farm is lost before the water gets to the plant roots in many irrigated areas. In spite of this low efficiency, about one-half of the irrigated area suffers a water shortage every year.

One of our big opportunities for the future rests in getting more efficient use and distribution of water already available. Proper repair of irrigation systems and proper water management applied to the irrigation lands of the West could substantially increase the total water supply for irrigation. We in the Soil Conservation Service consider the job of assisting in improving the efficiency of water use and management as one of our primary jobs in irrigated areas. We believe our accomplishments toward this end are significant.

In the 17 Western States, for example, we have assisted with improved water application on about 4½ million acres of irrigated land. We have assisted with

improved water management for irrigation on an additional 1¼ million acres. We have assisted in land leveling for irrigation on about 3¼ million acres. We have assisted in the installation of about 26,000 sprinkler irrigation systems and 84 hundred reservoirs. We have assisted in more than 2,000 group irrigation jobs comprising about 2 million acres on which nearly 6,000 miles of farm ditches and supply canals have been installed.

I recently reviewed a report evaluating this type of accomplishment in southern California. The efforts of our technical staff in this particular district had resulted in the reduction of over 3,000 acre-feet per year in water use in an area where water supplies are rapidly becoming critical. At the price commonly paid for extra water in this district, the savings was valued at more than one hundred thousand dollars. The saving was estimated to be enough water to irrigate at least 1,000 acres of citrus.

I should like to emphasize, too, the importance of drainage on irrigation lands. Drainage, to a greater or lesser degree, is a necessary part of every irrigation system. Seepage losses from canals, surface runoff, and deep percolation from farms are all sources of water which accumulate in the lower areas and cause waterlogging and salinity. The salt problem in many irrigation districts is insurmountable without adequate drainage.

The point I am getting at is this. Too many people have the concept that once water has been delivered to a farm for irrigation, the farmer enters a state of permanent stability and prosperity. As you well know, those just aren't the facts. It is the purpose of the Soil Conservation Service in irrigated areas to assist in the solution of problems that are encountered after water is delivered to the farm. I believe that you in the Reclamation Association must have a positive interest in this work because it has a direct bearing on the future prosperity in reclamation projects.

The Soil Conservation Service is vitally interested, too, in meeting the technical needs of settlers on new irrigation projects essential to getting their new farms into efficient operation. In many instances, such as in the Columbia Basin, the Missouri Basin, and other new projects, the Service has been able to assign sufficient technical personnel to project areas to meet these needs, without taking such assistance away from established projects.

The Department of Agriculture has recognized the problems. So have the Bureau of Reclamation, the Bureau of the Budget, and the Interior and Agriculture appropriations committee in Congress. They all agree that something should be done about it, but there has been lack of action because of jurisdictional questions.

The increasing importance of water in agriculture outside of the West is of great significance today. In the humid area of the United States we are losing about one-third of the annual rainfall through runoff. At the same time farmers in many localities in recent years have suffered severe crop losses due to the lack of adequate rainfall.

Consequently, we have a twofold development in water in these areas. On the one hand we have more and more farmers who are becoming aware of the importance of soil conservation practices that conserve moisture and make more efficient use of it. On the other hand we are on the threshold of tremendous activity in supplemental irrigation.

The medium and large rivers and streams in the Eastern United States that flow continuously year-round number well over a hundred. Adjacent to these streams is a total area of well drained rich valley land in excess of 50 million acres. There are thousands of farms in the humid States where water is available and where the necessary investment for supplemental irrigation might pay off. More and more farmers are becoming aware of these facts, and many have already invested in systems for supplemental irrigation.

Because most of the expansion in humid area irrigation has aken place since the last census was taken in 1950, accurate figures that will indicate the total growth are not available. There have been some judgment estimates made, however, which from our experiences in assisting farmers seem sound. These estimates indicate that supplemental irrigation has increased about 500 percent since 1950 and that more than 1 million acres are currently being so irrigated in Eastern and Southern States.

The severe drought during this period was undoubtedly a major factor in this development. But, it hasn't been the only factor. The advent of quick coupling, lightweight aluminum pipe has certainly made irrigation much easier, and the increasing demand of the American consumer for crops of high quality has emphasized the need for soil moisture control. The high costs of crop production have also indicated a need for the more stable farm economy that can be obtained with irrigation.

The opportunities for using river water to supplement rainfall on the rich valley lands of the Eastern United States are enormous. To me, it seems inevitable that those opportunities will become related to our watershed protection and flood prevention work in the years ahead.

As you know, the 83d Congress enacted Public Law 566, the Watershed Protection and Flood Prevention Act. This law provides a new authorization for approaching soil and water conservation problems on a watershed basis. It provides means for bringing the water element into balance with the soil element in our National soil and water conservation program. It is an implementing tool to our going program.

The primary objective of this Act is to provide the basis for local groups of people to cooperate with and receive assistance from the Federal Government in solving their flood prevention and water management problems in small watersheds.

The Act authorized the Department of Agriculture to cooperate with States and local agencies in carrying out jointly planned and mutually agreed on flood-prevention and water-management projects. It places responsibility on local organizations to initiate projects adapt plans to local requirements, share in the costs, and make provision for the plan's application and

maintenance. We have a new opportunity to work on problems that require group action that have been difficult to get at.

These opportunities are great in the Western States as they are in other parts of the country. The act recognizes the inter-relationship of land in irrigation projects and the tributary watershed lands above them. I would encourage you who are interested in reclamation to explore fully the opportunities that are present for the development of private irrigation enterprises through the Watershed Protection and Flood Prevention Act.

You will be interested to know that we are finding many watershed groups interested in a combination of irrigation development and watershed protection to an extent greater than provided for in this legislation. This interest undoubtedly had a bearing on the legislative proposal currently before the Congress for additional authorization for financing small irrigation projects in cooperation with local people.

Let me make clear the position of the Department of Agriculture on that matter. The Department recognizes fully the urgent need for moving ahead more rapidly in soil and water conservation, watershed protection, flood prevention, and small irrigation project development. We recognize that the problems involved are interrelated and that among the significant factors involved are adequate credit, adequate onsite technical assistance, and adequate research in soil-water-crop relationships.

The Soil Conservation Service stands ready to participate whole-heartedly in a practical cooperative approach with all agencies and organizations that can assist in rendering a more effective service to local groups interested in the development and protection of soil and water resources.

GRASS REPLACES WHEAT

(Continued from page 112)

In pointing up this development, Hoskins says: "All costs in my livestock operations—fencing, water developments, winter feed, labor, and so on, are charged as expenses against my grasslands. All the costs of cultivation, harvesting, machinery, etc., are charged against my cropland. The 2 months of grazing that my sheep obtain on cropland are charged against my grassland operations at the rate of $2.50 per animal unit month, the current pasture rate in this area. In final results, my cropland brings in more gross income per year, but when it comes to net farm income, I put more in my pocket from grassland operations. If I were to make an acre-for-acre comparison—cropland against grassland—I could show a greater net income from my grassland than I have indicated. I also have the deep satisfaction of knowing that my soil is staying on the hills where it will continue to produce. I'm seriously considering converting more of my acreage to grassland."

THE STORY OF FAO. By Gove Hambidge. 303 pp. Illustrated. 1955. New York: D. Nostrand Company.

ANYONE familiar with the several books authored by Gove Hambidge, or the long list of Agricultural Yearbooks which he edited, would expect a discriminating job on "The Story of FAO." That is precisely what you find in this 300 page book.

Officially, FAO had its inception in Quebec in October 1954, yet the real surge for such an organization started with the Conference on Food and Agriculture in Hot Springs, Va., 2 years earlier, and in the midst of the war, when representatives from 43 nations were assembled.

Hambidge attended the Hot Springs conference and later became Executive Secretary of the Interim Commission that had the responsibility of drafting the FAO constitution. He has been with FAO continuously since that time and he is now the North American Regional Representative.

In the early chapters we get a closeup view of the work of the bushy-eyed, capable but disarmingly frank Britisher, Sir John Orr, the Director-General. Later we learn how our own Norris E. Dodd shouldered the burdens of the international office until he was relieved a little more than a year ago by our Dr. P. V. Cardon.

Nowhere, perhaps, can we find a better account of the administration of FAO, but that is not the emphasis in this book. FAO is a human story and Hambidge has succeeded in making it just that—human.

The first chapter takes you to Egypt. Here you go into the villages, the homes, and the fields of the Egyptian peasants. They have a half acre of so of land each, and the equipment and methods in use are much the same as those in use hundreds and even thousands of years previously.

This grim Egyptian story is built around the fictional character, Abu Libda, and his family. In contrast, you are quietly shifted to an Iowa

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farm and the story here is about the fictional character of Jim Barton and his family, who live on a corn-hog-dairy farm in our fertile midland. Here is sketched the whole background of the development of modern American agriculture, hand in hand with industry.

In many countries and in many instances we are given a faithful picture of land misuse or land abuse, and related poverty and hunger, yet with all this Hambidge sounds a hopeful note. We quote:

"For instance, there is the rice breeding and other work in the Far East, in which many countries are getting together for the first time in history on projects of enormous potential benefit. There is the fight against desert locusts in the Middle East, where as a result of cooperative work the outlook for licking this terrible scourge is more hopeful than it has been since the days of the Pharoahs. There is the campaign against rinderpest, the major animal disease throughout the Far East, a killer at least as deadly as the foot-and-mouth disease with which we are familiar in our part of the world. All of this regional work is a natural for an international organization like FAO, and I think we have done major pioneering in that field. It is interesting that the U. S., according to recently announced plans, is going to emphasize the regional approach in its own bilateral programs.

"We are also carrying out projects and programs in some 50-odd individual countries, using teams of experts which in turn are drawn from over 50 countries—quite a few from the U. S., but also from nearly everywhere else where there are good technical workers. There is great variety in this work . . . for example, equipping fishermen's boats in Ceylon with motors for the first time, enabling them to double or triple or quadruple their catch . . . improving the skinning of animals in India and the tanning of hides and making of leather which brings a very considerably increased income to a lot of humble folk . . . improvements in the processing and packaging of dates in Iraq, which has meant a sizeable investment by the Iraqi date industry in U. S. equipment."

Credit is given for the work done by other agencies in government, as well as by churches, universities, and foundations which stretch back over many years. Those of us who contribute to foreign missions, or those of us who refuse to contribute to the work of the missions, will find his comments on this subject of considerable interest.

GLENN K. RULE

LEST WE FORGET.—Over the years I think many of us have been lulled into somewhat a false sense of security so far as soil erosion is concerned, due principally to the lack of rain. Because we did not observe much erosion in the open fields, I suppose we felt that everything was under control.

Rains have now pointed out the fact that our number of basic plans is inadequate, and that the open or cultivated land has not received its full share of attention. With a normal season of rainfall the amount of erosion is still alarming.

I think we have done a very good overall job on conservation engineering, woodland management, and pasture work, but we do need to accelerate the basic plans, particularly on open or cultivated land.

Good basic plans have been our main weapon against soil erosion. They still are. I think we should recognize this and be guided accordingly, with special attention to the needed treatment of open fields. We should remember that the movement of soil takes place on all sloping land—and sometimes on level land. And we should see that provisions are made in our planning to keep this soil in place with such practices, or combinations of practices on contour cultivation, stripcropping, terraces, rotations, crop residue management, and so on; and wherever water materially concentrates provisions such as grassed waterways should also be included. I don't think there is any substitute for this way of doing our conservation job.

—W. A. PHILLIPS

(Adapted from a letter written by Mr. Phillips, as Area Conservationist, to work unit personnel in his area of Virginia.)